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# CONDITIONAL MARKET FORECASTS AND IMPLICATIONS FOR THE U.S. SOYBEAN ECONOMY

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# Conditional Market Forecasts and Implications for The U.S. Soybean Economy

by

Jimmy L. Matthews, Agricultural Economist
National Economic Analysis Division, ERS*

**ABSTRACT:** Implications of dollar devaluation, short supplies of competing high protein feeds and soybean exports to the Soviet Union for the U.S. soybean economy in 1972/73 are explored with an econometric model. Incremental impacts of these variables along with many factors affecting the U.S. soybean economy are identified and discussed. Ramifications of recent events are extended to the 1973/74 and 1977/78 crop years for soybeans. Conditional market forecasts shown for these years indicate the most likely course of events but alternative forecasts could be derived by altering the basic assumptions.

**KEY WORDS:** Acreage, forecasting, models, prices, soybean meal, soybean oil, soybeans.

The 1972/73 marketing year saw prices for soybeans and soybean meal go into orbit. The escalation was not solely due to new Soviet purchases of soybeans and grains. Events in Peru, Japan, Germany, India, Saudi Arabia, and Brazil as well as in the United States contributed. The diverse set of circumstances and their impact on the U.S. soybean economy caught many forecasters by surprise, leading to heightened concern over future implications.

The impact of dollar depreciation in soybean importing nations for 1972/73 is still largely unmeasured. Full ramifications may not be known for some time. Increased demands in the Soviet Union and the Eastern Bloc nations are not fully known either. Supplies of competing products such as fish meal from Peru have been sharply lower. In addition, the sharp increase in grain exports to the USSR has limited the handling capacity at U.S. ports for soybeans. This had led to sharply higher f.o.b. charges for beans and sharp increase in gross margins.

This article presents comments on the effects of these and other factors on the U.S. soybean economy. These comments are based on data obtained from an econometric model of the soybean economy.[1] Hopefully, some insights not otherwise available can be developed which will provide an improved basis for understanding changes anticipated in 1973/74 and beyond.

The first section summarizes most of the key demand and supply factors and assumptions contributing to changes in annual average prices, utilization, and supplies of soybeans and soybean products. Particular attention is given to the possible contribution of these factors to changes in the U.S. soybean economy in 1972/73. The second section presents conditional model forecasts for 1972/73, 1973/74, and 1977/78. These conditional forecasts depend, of course, on the underlying validity of the model and the values assumed for the key demand and supply factors.

## Key Demand and Supply Factors and Their Implications

The major factors contributing to soybean price, use, and supply changes are summarized in table 5. In general, known values of the factors through

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*I would like to acknowledge the very able statistical assistance provided by Pearl L. Williams and Charlotte K. Tucker which makes current forecasts based on a formal analytical model feasible.

[1] This econometric model was discussed in the November 1971 issue of the *Fats and Oils Situation*, FOS-260. The basic model has been slightly modified to accommodate the effect of dollar devaluation.

1971/72 have been used in the 20-equation econometric model to generate forecasts for the U.S. soybean economy. Values for these factors beginning in 1972/73, are drawn from a number of sources including trend extrapolation, forecasts by other analysts, and qualitative judgments of the author.

Historically, the factors which have been quite important in explaining changes in the U.S. soybean economy are variations in livestock numbers, both foreign and domestic; livestock prices; availability of supplies of competing oilseed crops; consumer expenditures; price of feed grains, domestic feed grain programs, and the variable levy imposed on U.S. feed grains entering the Common Market countries. More recently, the emergence of the USSR as a buyer of U.S. soybeans and soybean products and the impact of the dollar's devaluation on soybean importing countries have been of large significance.

As shown in line 14 of table 5, for example, the USSR purchased 40 million bushels of U.S. soybeans in 1972/73. This factor is estimated to have increased U.S. farm prices by 15 cents per bushel in 1972/73 as shown in column 1 of table 6. Impacts on soybean meal prices ($4.10/ton increase) and other soybean variables are also presented in line 3 of table 6 for the reported change in USSR exports.

Estimated impacts for key factors influencing the U.S. soybean economy are obtained from information in tables 5, 7 and 8. Table 5 can be used to find the reported or estimated change for such a factor as Soviet exports. Tables 7 and 8 show the approximate impacts for a given hypothetical change in some demand or supply factor. For example, in table 7 the current year impact on soybean prices and use of increasing soybean exports to USSR by 37 million bushels (1 million metric ton) is shown as 14 cents per bushel in column 11. Since the reported change was 40 million bushels, the prorated impact is estimated as 15 cents (40,000/37,000 x .14). Table 8 is similar to table 7 except the impacts vary slightly depending on whether the factor is increased or decreased. The differences in tables 7 and 8 impacts are related largely to stock holdings.

Using the preceding procedures, the estimated impacts of other key factors on the U.S. soybean economy are estimated and summarized in table 6 for the 1972/73 marketing year. For the total net increase of $1.10 per bushel over 1971/72 in estimated farm prices of soybeans, 90 cents is attributed to foreign demand factors as follows: 15 cents to Soviet exports, 56 cents to depreciation of the dollar, and 15 cents to the expansion of the livestock economies in countries importing U.S. soybeans. Additionally, the small estimated decline in world availability of competing oilseed meal supplies contributed only 2 cents per bushel, and other factors in foreign markets contributed another 2 cents. This compares to a 77 cent increase in soybean prices attributed to increased demands in the United States. Much of the domestic demand pressures are attributed to increased U.S. livestock output and sharply higher U.S. livestock prices in 1972 and 1973. However, the estimated gross increase of $1.67 in soybean farm prices due to demand factors was offset partially by expanded margins, sharply increased f.o.b. charges for soybeans, and increased U.S. supplies of soybeans in 1972/73. Expanded U.S. supplies of soybeans in 1972/73 reduced farm prices by 19.5 cents in the model while expanded margins and f.o.b. charges reduced soybean farm prices by 31.5 cents per bushel. Other factors reduced prices by 6 cents for the net increase of $1.10 per bushel in the farm price of soybeans.

If only the expansion in foreign and domestic demands is considered, a little over half of the increase in U.S. soybean farm prices in 1972/73 can be traced to increased foreign demand. Further depreciation of the dollar in 1972/73 beyond that assumed, along with any further downward adjustments in the estimated availability of competing oilseed meals, would increase current year season-average farm prices for soybeans to around $4.25. The proportion of the price rise attributed to foreign demand would then approximate 60 percent in 1972/73.

### Conditional Market Forecasts

Conditional market forecasts for soybean prices, use, and supplies are shown in table 9. Model estimates for 1971/72 are shown in column 5 and can be compared with reported values for 1971/72 given in column 3. This provides some basis for judging the validity of the model when most of the information given in table 5 is shown. The 1972/73 model forecasts are based on the information in table 5 and were partially discussed in the previous section. The estimates compare favorably with the official preliminary estimates for 1972/73 shown in column 4 of table 9.

Model forecasts for 1973/74 are again based on the values in table 5 plus 1972/73 estimated farm prices for soybeans, corn, and cotton, and provisions of the 1973 farm programs for feed grains, soybeans, and cotton. The latter items are required for the model's estimation of 53.1 million harvested acres of beans in 1973. Lagged market prices are the most significant factors for estimating the acreage, as can be seen from table 10. Each 10 cent increase in market price for soybeans is normally expected to increase soybean harvested acreage by 624,000 acres. The estimated $1.10 increase would be expected to increase soybean acreage by 6.9 million acres while the 22 cent per bushel increase in corn prices would have the effect of reducing soybean acreage by 2.3 million acres. The result would be a net increase of 4.6 million acres. Changes in the feed grain program are the major factors in the remaining estimated increase of around 3 million acres. Assumptions made for the farm programs in 1972/73 and 1973/74 are as follows:

| | 1972/73 | 1973/74 |
|---|---|---|
| Corn[1] | | |
| Set-aside (percent) | 25[2] | |
| Option A (percent) | | 10 |
| Option B (percent) | | 0 |
| Set-aside payment ($/bu.) | .40 | |
| Option A ($/bu.) | | .32 |
| Option B ($/bu.) | | .15 |
| Loan rate ($/bu.) | 1.05 | 1.05 |
| Cotton | | |
| Domestic allotment (mil. ac.) | 11.5 | 10.0 |
| Set-aside allotment (percent) | 20 | 0 |
| Set-aside payment (gross weight; $/lb.) | .15 | .15 |
| Loan rate (gross weight: $/lb) | .187 | .187 |

[1] Actual program provisions as announced differ slightly from those assumed here. [2] Two program options for additional voluntary diversion up to 10 percent of base acreage were offered in 1972/73.

The model's estimated soybean production of 1,512 million bushels in 1973 is derived by multiplying the harvested acreage by the official yield projection of 28.5 bushels. This production in conjunction with the values in table 5 for 1973/74 would result in soybean prices of $3.78 per bushel, soybean meal prices of $146.60 per ton, and oil prices of around 12 cents per pound. Minimum carryout stocks are likely to be repeated with total soybean exports near 600 million bushels for 1973/74. Part of this export demand is in the replacement of pipeline stocks which could end up in somewhat larger domestic stocks and a little lower exports than indicated by the model. In addition, only a 4 percent expansion in competing supplies of oilseed crops in 1973/74 is assumed in table 5. A return to normal production levels by Peru in 1973/74 could increase total competing meal supplies by around 15 percent. An increase of this magnitude would be expected to reduce U.S. soybean exports by 25 million bushels to around 575 million bushels.

Considerable price strength is indicated for the 1973/74 marketing year in spite of the model's nearly 8 million acre estimated increases in soybeans. Exports to the Soviet Union, Peruvian fish meal supplies, and domestic production would appear to be key factors which could alter these price outcomes in 1973/74.

In column 9 and 10 of table 9, alternative forecasts for 1973/74 are shown for different production possibilities. If production should be 50 million bushels more, prices for soybeans could average closer to $3.60 per bushel while 50 million bushels less would raise prices to $4.00. The 50 million bushels is equivalent to nearly 2 million more acres of soybeans. This additional acreage is a possibility based on the below-average planting conditions for corn this year. However, a drop of 1.0 bushel in average yields would result in 50 million bushels fewer beans. The combination of additional acreage and lower average yields is a possibility with the two factors possibly offsetting each other.

A very conservative alternative estimate for 1973/74 bean prices would be $3.00 per bushel instead of the estimated $3.78. This could result if the Soviet Union did not import any U.S. soybeans instead of 70 million bushels, the Brazilians increased their soybean exports by 50 million bushels, the Peruvians more than doubled their fish meal production to around 2 million metric tons, U.S. producers harvested 56 million acres of soybeans with an average yield of 28.5 bushels per acre, and the growth in foreign livestock output increased by 3 percent instead of the estimated 5 percent in 1974. Elimination or reduction in the variable levy imposed on U.S. feed grains would also reduce soybean demand and prices. The current levy is around $1.40 per bushel on feed grains. Total elimination could depress soybean prices by as much as 50 cents per bushel in the short run.

On the bullish side for U.S. producers, exports to the Soviet Union of 2.5 million metric tons combined with a 1,462 million bushel soybean crop in the United States, another short Peruvian fish catch, and a return to gross margins near the 1971/72 levels could raise season-average farm prices to $4.50 per bushel in 1973/74. An additional 10 percent depreciation of the dollar on top of these factors could push soybean farm prices to near the $5.00 per bushel level.

Based on the July Crop Production Report, producers are likely to harvest 55.7 million acres of soybeans in 1973. If trend yields of 28.5 bushels per acre are used, this would generate 1,588 million bushels of soybeans. However, the government of Peru announced in July 1973 that the fishing season may not be opened before March 1974. Additional depreciation of the dollar in several markets in the past few weeks also has continued to add to demand strength (estimated at near 5 percent). These demand considerations, along with margins near the 1971/72 levels, would lead to an estimated price of $4.35 per bushel in the model if supplies of soybeans were only 1,512 million bushels. A 1,588 million bushel crop in conjunction with the strength in demand indicated above would suggest a season average farm price of $4.11 per bushel in the model for 1973/74.

Over the next 5 years, conditions set out in table 5 for 1977/78 would suggest soybean acreage of around 56 to 57 million harvested acres with an average price for soybeans of $3.50 per bushel. Demand and prices for meal would remain strong, averaging $125.00 to $130.00 per ton in 1977/78. The expansion in soybean oil demand, however, would not keep pace with expanding oil supplies. As a consequence, oil prices would work lower and possibly average near 8 cents per pound by 1977/78.

Table 5.--Data for exogenous demand and supply variables used in formulating market forecasts and projections

| Exogenous variable | Program code | Letter code | Unit | Average 1954/55 to 1970/71 | 1969/70 | 1970/71 | 1971/72 | 1972/73 | 1973/74 | 1977/78 | Average growth rate percent 1961/62 to 1971/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| U.S. price of corn | X0(1) | PC | $/bu. | 1.17 | 1.16 | 1.33 | 1.08 | 1.29 | 1.35 | 1.25 | 0.5 |
| U.S. real food expenditures | X0(4) | E | Bil. dol.1/ | 85.1 | 98.1 | 100.4 | 101.0 | 103.0 | 104.2 | 110.6 | 2.1 |
| Foreign livestock output | X0(7) | LW | Mil. 1/ 2/ | 468.0 | 550.0 | 572.0 | 594.0 | 618.0 | 655.0 | 737.0 | 2.8 |
| Price of corn plus variable levy | X0(8) | $PC+D_t$ | $/bu. | 1.63 | 2.16 | 2.83 | 2.54 | 2.67 | 2.50 | 2.50 | 8.3 |
| U.S. consumption of cottonseed oil and palm oil | X0(6) + X0(14) | QCOD + QPOD | Mil. lb. | 1,258 | 1,177 | 1,076 | 1,185 | 1,300 | 1,325 | 1,325 | -1.3 |
| World supplies of other oilseed meals | X0(16) | OM | Mil. m.t.1/ | 10.0 | 11.0 | 11.3 | 12.1 | 11.9 | 12.2 | 13.7 | 2.4 |
| U.S. crushing margin | X0(18) | $W_t$ | $/bu. | .36 | .73 | .67 | .41 | .80 | 1.00 | .40 | .9 |
| P.L. 480 soybean oil exports | X0(19) | QOXPL | Mil. lb. | 802 | 778 | 803 | 735 | 569 | 800 | 1,150 | 7.9 |
| U.S. soybean yield | X0(23) | YLD | Bu./ac. | 24.0 | 27.4 | 26.7 | 27.5 | 28.0 | 28.5 | 30.5 | 1.5 |
| U.S. consumption of other high protein feeds | X0(32) | QP | 1,000 tons | 6,437 | 6,172 | 6,385 | 6,575 | 6,875 | 6,775 | 7,363 | .3 |
| U.S. consumption of edible animal fats | X0(36) | QBL | Bil. lb. 1/ | 3.9 | 3.4 | 3.4 | 3.4 | 2.9 | 3.1 | 3.3 | -2.4 |
| U.S. livestock output | X0(42) | LO | Bil. dol. | 18.6 | 21.6 | 22.2 | 21.9 | 22.2 | 23.0 | 24.8 | 1.7 |
| U.S. farm prices for livestock | X0(43) | PL | 1957-59=100 | 100.7 | 119.9 | 114.5 | 134.2 | 159.0 | 140.0 | 152.0 | 3.4 |
| Soybean exports to USSR | X0(44) | QSX-R | Mil. bu. 1/ | --- | 0 | 0 | 0 | 40.0 | 70.0 | 110.0 | --- |
| Handling charges | X0(45) | FOB | $/bu. | --- | 0 | 0 | 0 | .60 | 0 | 0 | --- |
| Dollar depreciation in soybean oil markets | X0(46) | DEV-0 | | 1.00 | 1.00 | 1.00 | 1.00 | .900 | .900 | .900 | --- |
| Dollar depreciation in bean and meal markets | X0(50) | DEV | | 1.00 | 1.00 | 1.00 | .935 | .750 | .775 | .775 | --- |

1/ For convenience in reporting this table, the decimal has been shifted 3 places to the left.

2/ Livestock production units.

Table 6.--Estimated annual effect of major market factors on prices and utilization of soybeans and soybean products in 1972/73

| Market factor | Code letter | PS | PM | PO | QSC | QSX | QMX | QMD | QOD |
|---|---|---|---|---|---|---|---|---|---|
| | | $/bu. | $/ton | ¢/lb. | Mil. bu. | Mil. bu. | Bil. lb. | Bil. lb. | Mil. lb. |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| U.S. production of soybeans | QSS | -0.310 | -6.20 | -1.45 | 32.30 | 30.75 | 0.280 | 1.15 | 159.70 |
| Beginning stocks of soybeans | $SS_{-1}$ | .115 | 2.50 | .510 | -11.15 | -11.26 | -.095 | -.435 | -57.45 |
| Soybean exports to USSR | QSX-R | .150 | 4.10 | .660 | -15.50 | -9.55 | -.120 | -.700 | -61.55 |
| U.S. soybean oil exports 1/ | QOX | -.020 | .535 | -.275 | -2.40 | 3.45 | -.020 | -.090 | 29.90 |
| Dollar depreciation in bean and meal importing countries | DEV | .480 | 19.15 | .280 | -6.40 | 11.30 | -.055 | -.240 | -29.80 |
| Dollar depreciation in soybean oil markets | DEV-O | .080 | -.600 | .930 | 6.35 | -10.25 | .060 | .110 | 32.70 |
| Livestock production in foreign countries | LW | .150 | 4.65 | .400 | -7.85 | 20.25 | .330 | -.770 | -45.65 |
| World supplies of other oilseed meals | OM | .020 | .700 | .030 | -.565 | 3.30 | .070 | -.130 | -2.80 |
| Price of corn + variable levy | $PC+D_t$ | .040 | 1.15 | .125 | -2.40 | 6.30 | .050 | -.190 | -14.33 |
| U.S. livestock output | LO | .010 | .640 | -.040 | .965 | -.220 | -.025 | .010 | 4.20 |
| Current year farm prices of all livestock | PL | .070 | 5.40 | -.430 | 9.30 | 3.95 | -.035 | .430 | 54.30 |
| Last year farm prices of all livestock | $PL_{-1}$ | .610 | 29.90 | -.850 | 8.10 | -12.65 | -.270 | .680 | 94.15 |
| U.S. real consumption expenditures | E | .020 | -.620 | .330 | 3.20 | -3.95 | .030 | .115 | 112.65 |
| U.S. consumption of edible animal fats | QBL | .060 | -1.80 | .900 | 8.97 | -11.35 | .075 | .345 | 320.05 |
| U.S. consumption of cottonseed oil and palm oil | QCOD + QPOD | -.005 | .200 | -.120 | -1.10 | 1.35 | -.010 | -.040 | -38.05 |
| Oil crushing yield | O-YLD | .020 | -.800 | .690 | 3.50 | -3.00 | .030 | .135 | -67.00 |
| U.S. consumption of other high protein feeds | QP | -.020 | -2.15 | .290 | -6.30 | -1.80 | .080 | -.380 | -31.05 |
| Gross margin | W | -.195 | 4.70 | .860 | -19.70 | 23.85 | -.115 | -.505 | -62.85 |
| Handling charge | FOB | -.120 | 22.80 | -.660 | 13.70 | -14.45 | .120 | .540 | 73.70 |
| All others | | -.055 | -7.85 | .220 | -3.05 | 2.00 | .060 | -.063 | -130.80 |
| Total change | | 1.10 | 76.40 | 2.40 | 10.00 | 28.00 | .440 | -.028 | 340.00 |

1/ Total oil exports including P.L. 480 oil shipments.

Table 7.--First year impact of exogenous demand and supply variables which influence the U.S. soybean economy 1/

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| Variables | Code letter | Assumed change | Supply |  |  |  | Exports |  | Domestic consumption |  | Ending stocks |  | Prices |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | QSS | QSC | QMP | QOP | QSX | QMX | QMD | QOD | SS | SO | PS | PM | PO |
|  |  |  | Mil. bu. | Mil. bu. | Bil. lb. | Mil. lb. | Mil. bu. | Bil. lb. | Bil. lb. | Mil. lb. | Mil. bu. | Mil. lb. | $/bu. | $/ton | ¢/lb |
|  |  |  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| U.S. production of soybeans | QSS | +100 mil. bu. | 0 | 32.31 | 1.50 | 346.17 | 30.76 | 0.28 | 1.14 | 159.68 | 34.87 | 186.97 | -0.31 | -6.20 | -1.46 |
| Soybean exports to USSR | QSX-R | +37 mil. bu. | 0 | -14.37 | -.68 | -156.20 | -8.84 | -.11 | -.65 | -57.01 | -15.59 | -94.66 | .14 | 3.80 | .61 |
| P.L. 480 oil increase | QOXPL | +100 mil. lb. | 0 | 2.68 | .13 | 29.05 | -3.88 | .02 | .10 | -33.57 | 1.14 | -37.45 | .02 | -.60 | .31 |
| Livestock production in foreign countries | LW | +5 percent | 0 | -9.82 | -.49 | -113.25 | 25.30 | .41 | -.96 | -57.08 | -15.59 | -59.87 | .19 | 5.80 | .50 |
| U.S. livestock output | LO | +5 percent | 0 | 4.83 | .22 | 51.38 | -1.13 | -.12 | .04 | 21.06 | -3.68 | 30.01 | .06 | 3.20 | -.21 |
| Current year farm prices all livestock | PL | +5 percent | 0 | 2.59 | .12 | 28.20 | 1.08 | -.01 | .12 | 15.08 | -3.90 | 13.49 | .02 | 1.50 | -.12 |
| Last year farm prices all livestock | $PL_{-1}$ | +5 percent | 3.15 | 2.40 | .12 | 28.35 | -3.72 | -.08 | .20 | 27.69 | 0 | 15.94 | .18 | 8.80 | -.25 |
| U.S. real consumption expenditures | E | +5 percent | 0 | 7.95 | .37 | 85.55 | -9.91 | .07 | .29 | 281.67 | 1.54 | -196.01 | .05 | -1.55 | .83 |
| U.S. consumption of edible animal fats | QBL | +10 percent | 0 | -6.00 | -.28 | -65.54 | 7.59 | -.05 | -.23 | -213.33 | -1.54 | 147.51 | -.04 | 1.20 | -.62 |
| World supplies of other oilseed meals | OM | +.8 mil. m.t. | 0 | 2.14 | .11 | 24.52 | -12.06 | -.28 | .39 | 12.24 | 10.06 | 13.45 | -.06 | -2.20 | -.11 |
| U.S. consumption of other high protein feeds | QP | +5 percent | 0 | -6.30 | -.30 | -68.55 | -1.81 | .08 | -.38 | -31.04 | 8.14 | -37.58 | -.02 | -2.15 | .29 |
| U.S. consumption of cottonseed oil & palm oil | QCOD + QPOD | +5 percent | 0 | -.54 | -.02 | -5.84 | .68 | -.005 | -.02 | -19.02 | -.14 | 13.15 | -.002 | .10 | -.06 |
| Average import levy on corn | $D_t$ | +50¢/bu. | 0 | -9.66 | -.49 | -111.86 | 25.12 | .21 | -.75 | -57.33 | -15.59 | -58.33 | .16 | 4.60 | .50 |
| Gross margin | W | +10¢/bu. | 0 | -5.05 | -.24 | -54.31 | 8.99 | -.05 | -.19 | -24.19 | -3.97 | -29.47 | -.05 | 1.20 | .22 |
| Dollar depreciation in bean & meal markets | DEV | +10 percent | 0 | -3.46 | -.16 | -37.10 | 6.11 | -.03 | -.13 | -16.11 | -2.72 | -20.41 | .26 | 10.36 | .15 |
| Handling charges | FOB | +10¢/bu. | 0 | 2.29 | .11 | 25.15 | -2.41 | .02 | .09 | 12.28 | 0 | 12.97 | -.02 | 3.80 | -.11 |
| Dollar depreciation in soybean oil markets | DEV-O | +10 percent | 0 | 6.35 | .27 | 62.63 | -10.51 | .06 | .11 | 32.68 | 1.80 | 30.90 | .08 | -.60 | .93 |

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1/ The impact multipliers presented in this table are not invariant with respect to the level of soybean stocks. They are reasonable approximations when soybean stocks are greater than 60 million bushels but less than 150 million bushels.

Table 8 .--First year impact of exogenous demand and supply variables which influence the U.S. soybean economy 1/

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| Variables | Code letter | Assumed change | Supply |  |  |  | Exports |  | Domestic consumption |  | Ending stocks |  | Prices |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | QSS | QSC | QMP | QOP | QSX | QMX | QMD | QOD | SS | SO | PS | PM | PO |
|  |  |  | Mil. bu. | Mil. bu. | Bil. lb. | Mil. lb. | Mil. bu. | Bil. lb. | Bil. lb. | Mil. lb. | Mil. bu. | Mil. lb. | $/bu. | $/ton | ¢/lb. |
|  |  |  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| U.S. production of soybeans | QSS | -100 mil. bu. | 0 | -41.36 | -1.96 | -451.11 | -41.71 | -0.36 | -1.62 | -212.87 | -15.59 | -235.28 | 0.43 | 9.20 | 1.88 |
| Soybean exports to USSR | QSX-R | -37 mil. bu. | 0 | 11.94 | .54 | 123.79 | 12.06 | .11 | .34 | 59.54 | 10.91 | 64.87 | -.10 | -1.80 | -.53 |
| P.L. 480 oil increase | QOXPL | -100 mil. lb. | 0 | -2.69 | -.13 | -29.10 | 3.88 | -.02 | -.10 | 33.58 | -1.15 | 37.41 | -.02 | .60 | -.31 |
| Livestock production in foreign countries | LW | -5 percent | 0 | 7.28 | .35 | 80.60 | -28.75 | -.46 | .81 | 38.46 | 21.51 | 43.93 | -.14 | -4.40 | -.35 |
| U.S. livestock output | LO | -5 percent | 0 | -7.59 | -.36 | -83.90 | -1.86 | .10 | -.48 | -36.96 | 8.92 | -46.52 | -.02 | -2.30 | .35 |
| Current year farm prices all livestock | PL | -5 percent | 0 | -3.45 | -.16 | -37.23 | -.94 | -.01 | -.16 | -16.65 | 4.38 | -20.24 | -.01 | -1.10 | .16 |
| Last year farm prices all livestock | $PL_{-1}$ | -5 percent | -1.86 | -3.55 | -.16 | -37.29 | 5.67 | .07 | -.24 | -25.85 | 0 | -30.73 | -.17 | -8.35 | .30 |
| U.S. real consumption expenditures | E | -5 percent | 0 | -8.22 | -.40 | -91.50 | -10.62 | -.07 | -.36 | -281.21 | -3.18 | 189.79 | -.04 | 1.95 | -.81 |
| U.S. consumption of edible animal fats | QBL | -10 percent | 0 | 5.98 | .28 | 65.28 | -7.56 | .05 | .23 | 213.37 | 1.48 | -147.68 | .04 | -1.20 | .62 |
| World supplies of other oilseed meals | OM | -.8 mil. m.t. | 0 | -2.26 | -.14 | -32.38 | 13.22 | .29 | -.52 | -11.26 | -13.25 | -21.57 | .08 | 2.80 | .13 |
| U.S. consumption of other high protein feeds | QP | -5 percent | 0 | 4.53 | .21 | 47.68 | -.67 | -.10 | .30 | 19.15 | -3.90 | 27.78 | .04 | 2.55 | -.19 |
| U.S. consumption of cotton-seed oil & palm oil | QCOD + QPOD | -5 percent | 0 | .54 | .02 | 5.84 | -.68 | .005 | .02 | 19.02 | .14 | -13.15 | .002 | -.10 | .06 |
| Average import levy on corn | $D_t$ | -50¢/bu. | 0 | 9.11 | .40 | 91.62 | -26.59 | -.23 | .54 | 44.56 | 15.29 | 46.26 | -.12 | -3.00 | -.39 |
| Gross margin | W | -10¢/bu. | 0 | 4.72 | .23 | 52.63 | -8.76 | .03 | .20 | 24.62 | 3.84 | 29.21 | .05 | -.80 | -.23 |
| Dollar depreciation in bean and meal markets | DEV | -10 percent | 0 | 3.79 | .17 | 38.89 | -6.43 | .03 | .09 | 19.41 | 1.64 | 20.29 | -.21 | -8.19 | -.17 |
| Handling charges | FOB | -10¢/bu. | 0 | 3.55 | .17 | 40.30 | .29 | .02 | .18 | -2.62 | 0 | 44.49 | -.02 | -5.20 | -.15 |
| Dollar depreciation in soybean oil markets | DEV - 0 | -10 percent | 0 | -5.67 | -.27 | -61.20 | 10.13 | -.53 | -.21 | -27.59 | -4.46 | -33.13 | -.06 | 1.20 | -.78 |

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1/ The impact multipliers presented in this table are not invariant with respect to the level of soybean stocks. They are reasonable approximations when soybean stocks are greater than 60 million bushels but less than 150 million bushels.

Table 9.--Economic forecasts and projections for the U.S. soybean economy

Model Run I

| Endogenous variable | Code letter | Unit | Average 1954/55 to 1970/71 | Reported | | Preliminary estimates 1972/73 | Model forecasts | | | | Alternative forecasts | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1970/71 | 1971/72 | | 1971/72 | 1972/73 | 1973/74 | 1977/78 | 1973/74 1/ | 1973/74 1/ |
| | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Supply | | | | | | | | | | | | |
| U.S. production of soybeans | QSS | Mil. bu. | 1,054 | 1,127 | 1,176 | 1,283 | 1,181 | 1,281 | 1,512 | 1,713 | 1,562 | 1,462 |
| Total soybean crush | QSC | Mil. bu. | 470 | 760 | 721 | 735 | 727 | 737 | 815 | 898 | 831 | 794 |
| Soybean meal production | QMP | Bil. lb. | 22.2 | 36.1 | 34.0 | 34.0 | 34.5 | 34.9 | 38.6 | 42.6 | 39.4 | 37.6 |
| Soybean oil production | QOP | Mil. lb. | 5,091 | 8,265 | 7,892 | 7,685 | 7,930 | 7,812 | 8,885 | 9,787 | 9,058 | 8,659 |
| Exports | | | | | | | | | | | | |
| Soybeans | QSX2/ | Mil. bu. | 198 | 434 | 417 | 490 | 415 | 483 | 605 | 722 | 620 | 584 |
| Soybean meal | QMX | Bil. lb. | 3.5 | 9.1 | 7.6 | 9.4 | 8.1 | 8.6 | 9.3 | 10.8 | 9.4 | 9.1 |
| Soybean oil | QOX3/ | Mil. lb. | 383.1 | 1,742 | 1,388 | 1,200 | 1,389 | 1,269 | 1,650 | 1,900 | 1,650 | 1,650 |
| Domestic consumption | | | | | | | | | | | | |
| Soybean meal | QMD | Bil. lb. | 18.9 | 26.9 | 26.2 | 24.5 | 26.4 | 26.4 | 29.3 | 31.7 | 29.9 | 28.5 |
| Soybean oil | QOD | Mil. lb. | 4,060 | 6,253 | 6,449 | 6,725 | 6,481 | 6,820 | 6,901 | 7,616 | 6,980 | 6,795 |
| Ending stocks | | | | | | | | | | | | |
| Soybeans, August 31 | SS | Mil. bu. | 43 | 99 | 72 | 40 | 66 | 50 | 50 | 85 | 67 | 42 |
| Soybean oil, September 30 | SO | Mil. lb. | 470 | 773 | 785 | 525 | 833 | 556 | 890 | 1,075 | 983 | 772 |
| Prices | | | | | | | | | | | | |
| Soybeans (received by farmers) | PS | $/bu. | 2.38 | 2.85 | 3.03 | 4.25 | 3.02 | 4.12 | 3.78 | 3.50 | 3.62 | 4.00 |
| Soybean meal (Decatur) | PM | $/ton | 66.40 | 78.50 | 90.20 | 225.00 | 93.40 | 169.80 | 146.60 | 129.20 | 143.50 | 151.20 |
| Soybean oil (Decatur) | PO | ¢/lb. | 10.5 | 12.8 | 11.3 | 14.0 | 11.2 | 13.7 | 12.1 | 7.7 | 11.4 | 13.0 |
| Acres harvested | | | | | | | | | | | | |
| Corn Belt | ACB | Mil. ac. | 16.3 | 21.8 | 22.3 | 24.2 | 22.5 | 23.4 | 25.9 | 28.5 | | |
| Delta | AD | Mil. ac. | 4.6 | 8.7 | 8.6 | 8.1 | 8.6 | 8.9 | 9.6 | 11.7 | | |
| Other regions | AM | Mil. ac. | 2.1 | 11.7 | 11.8 | 13.5 | 11.9 | 13.0 | 17.6 | 16.0 | | |
| Total U.S. | | Mil. ac. | 23.0 | 42.2 | 42.7 | 45.8 | 43.0 | 45.3 | 53.1 | 56.2 | | |

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1/ These alternative demand estimates are derived by using other soybean production levels in lieu of the 1,512 million bushels by the most likely set of model assumptions. These alternatives were considered likely to cover most production possibilities in 1973/74.

2/ QSX includes soybean exports to USSR as shown in table 5.

3/ QOX is treated as exogenous.

Table 10.--Regional effects on soybean harvested acres of 10-cent increase in prices received by farmers in the previous year

| Region | Soybeans | Corn | Cotton |
|---|---|---|---|
| | Thousand acres | | |
| Lake 1/ | 99 | -108 | --- |
| Corn Belt 2/ | 170 | -442 | --- |
| Plains 3/ | 107 | -168 | --- |
| Delta 4/ | 20 | --- | -284 |
| Atlantic 5/ | 108 | -176 | --- |
| Other 6/ | 120 | -160 | -759 |
| Total | 624 | -1,054 | -1,043 |

1/ Michigan, Wisconsin and Minnesota. 2/ Ohio, Indiana, Illinois, Iowa and Missouri. 3/ North Dakota, South Dakota, Nebraska and Kansas. 4/ Mississippi, Arkansas and Louisiana. 5/ Maryland, Delaware, Virginia, North Carolina and South Carolina. 6/ Tennessee, Kentucky, Alabama, Georgia and 6 other States.

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